

# **The Fiber Society**

## **Fall 2002 Annual Technical Conference October 16-18, 2002**

Natick Crowne Plaza  
Natick, Massachusetts

### **Conference Co-Chairs**

Heidi Schreuder-Gibson  
Phillip Gibson  
U.S. Army Soldier Systems Center

### **Organizing Committee**

Tom Godfrey, U.S. Army Soldier Systems Center  
Julie Chen, University of Massachusetts Lowell  
Steve Warner, University of Massachusetts Dartmouth  
Greg Rutledge, Massachusetts Institute of Technology  
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### **The Fiber Society**

Room 3330  
College of Textiles  
North Carolina State University  
2401 Research Drive  
Raleigh, NC 27695-8301  
<http://www.thefibersociety.org>

### **Organized by:**

U.S. Army Soldier Systems Center

### **Sponsors**

Albany International  
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**Tuesday October 15, 2002**

7-9 pm **REGISTRATION**  
7:30 **Reception**

**Wednesday Oct 16, 2002 (morning)**

7:00 **REGISTRATION**  
**Pick-up Breakfast**

7:45 **OPENING REMARKS**

**Polymers and Processing**  
**Chair: Greg Rutledge, MIT**

8:00 **Morphological and Orientation Effects on the Optical and Electronic Properties of Conjugated Electroactive Organic Polymeric Fibers**

Richard V. Gregory

School of Materials Science and Engineering and NSF/ERC Center for Advanced Fibers and Films,  
Clemson University, Clemson, South Carolina

8:30 **Molecular Simulation of Polymer Crystallization: Growth Kinetics**

Numan Waheed, Min Jae Ko, Gregory C. Rutledge

Department of Chemical Engineering, Massachusetts Institute of Technology,  
Cambridge, Massachusetts

9:00 **Physical Properties and Morphology of Polypropylene/Nylon 6 Alloy Filaments**

B. S. Gupta<sup>1</sup>, R. Koteck<sup>1</sup>, M. Afshari<sup>2</sup>

<sup>1</sup>Textile Chemistry and Engineering Department, North Carolina State University, Raleigh, North Carolina, <sup>2</sup>Textile Engineering Department, Amir Kabir University of Technology, Iran

9:30 **Lewis Acid Complexation of Nylon 66 and Effect of Hydrogen Bonding on Film Drawability**

Richard Koteck, Dong Wook Jung, Alan E. Tonelli, Nad Vasanthan\*

College of Textiles, North Carolina State University, Raleigh, North Carolina

\*TRI/Princeton, Princeton, New Jersey

10:00 **BREAK**

10:15 **Determination of the Orientation Parameters and the Raman Tensor of the 998 cm<sup>-1</sup> Band of Poly(ethylene Terephthalate)**

Shuying Yang and Stephen Michielsen

School of Textile and Fiber Engineering, Georgia Institute of Technology, Atlanta, Georgia

10:45 **Numerical Simulation of Hydroentangling Orifice Flow**

H. Vahedi Tafreshi, B. Pourdeyhimi

Nonwovens Cooperative Research Center, North Carolina State University,  
Raleigh, North Carolina

11:15 **A Blending of Thai Hybrid Silk Wastes and Cotton in The Cotton's Spinning System**

R. Chollakup, A. Sinoimeri, J. Y. Dréan

Laboratoire de Physique et Mécanique Textiles, Ecole Nationale Supérieure des Industries Textiles de Mulhouse, Université de Haute-Alsace, Mulhouse, France

11:45 **CLOSING REMARKS**

12-1:30 **LUNCH**

**Wednesday Oct 16, 2002 (afternoon)**

**Fiber and Fabric Treatments**

**Chair: Memis Acar, Loughborough University**

**1:45 Plasma Deposition of a Durable, Water Repellent Coating on Aramid Fabric**

D. Tessier, M. Filteau

CTT Group, Center for Textile Technologies, Quebec, Canada

**2:15 Evaluating Single –Use Operating Room Gowns:  
The Influence of the Sterilisation using Different Doses of Ionising Irradiation**

L. Schacher<sup>1</sup>, D.C. Adolphe<sup>1</sup>, M.J. Abreu<sup>2</sup>, M.E. Cabeço-Silva<sup>2</sup>

<sup>1</sup>Ecole Nationale Supérieure des Industries Textiles de Mulhouse, Mulhouse, France, <sup>2</sup>Universidade Minho, Department of Textile Engineering, Campus de Azurem, Guimarães, Portugal

**2:45 Antibacterial Activity of Polyamide Fabrics**

D. Saihi<sup>1</sup>, A. El-Achari<sup>1</sup>, A. Ghenaim<sup>2</sup>, C. Caze<sup>1</sup>

<sup>1</sup>GEMTEX Research Laboratory, Ecole Nationale Supérieure des Arts et Industries Textiles, Roubaix, France, <sup>2</sup>Ecole Nationale Supérieure des Arts et Industries de Strasbourg, Strasbourg, France

**3:15 BREAK**

**4:00-4:45 STUDENT PAPER COMPETITION PRESENTATIONS**

**Ultra-Fine Carbon Fibers and Fibrous Structures from Electro-Spun  
PAN Polymer Solution**

Ashraf A. Ali

Advisor: Frank K. Ko

Department of Materials Engineering, Drexel University, Philadelphia, Pennsylvania

**Comparison of Newtonian and Viscoelastic Constitutive Models for  
Dry Spinning of Polymer Fibers**

Zeming Gou

Advisor: Anthony J. McHugh

Department of Chemical Engineering, University of Illinois at Urbana-Champaign, Urbana, Illinois

**Investigation of Structure-Property Relationship in In-Situ Composite Fibers  
Based on a Thermotropic Liquid Crystalline Polymer**

Xiaojun He, Michael S. Ellison and Rajesh P. Paradkar

Advisor: Michael S. Ellison

School of Materials Science & Engineering and Center for Advanced Engineering Fibers and Films, Clemson University, Clemson, South Carolina

**5:15 ANNUAL MEMBERSHIP BUSINESS MEETING**

**6:00-8:00 POSTER SESSION**

**Thursday Oct 17 Session A (morning)**

**7:00 REGISTRATION**  
**Pick Up Breakfast**

**Fiber and Fabric Mechanics**

**Chair: Ning Pan, University of California Davis**

**8:00 False Twist Induced Loss of Yarn Tenacity**

Urs Meyer

Institute for Manufacturing Automation Institute for Manufacturing Automation  
Federal Institute of Technology, ETH Zurich, Zurich, Switzerland

**8:30 Omnidirectional Measurement of the Compliance of Woven Fabrics**

Claudio Caccia

Politecnico di Milano, Milano, Italy

**9:00 Fiber-to-Fiber Load Transfer in the Extension of Twisted Yarns**

Thomas A. Godfrey<sup>1</sup>, John N. Rossettos<sup>2</sup>, Sinan Müftü<sup>2</sup>

<sup>1</sup>Natick Soldier Center, US Army Soldier & Biological Chemical Command, Natick, Massachusetts

<sup>2</sup>Department of Mechanical Engineering, Northeastern University, Boston, Massachusetts

**9:30 Strain Sensitivity of Polypyrrole-Coated Fabrics Under Unidirectional Tensile Deformation**

M.Y. Leung, X.M. Tao, M.C.W. Yuen

Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Kowloon, Hong Kong

**10:00 BREAK**

**10:15 Resistance of Staple Yarns to Dynamic Loading**

Maria Cybulska

Department of Textile Architecture, Faculty of Textile Engineering and Marketing,  
Technical University of Lodz, Poland

**10:45 Characterization of the Mendability of Carpet Backing Fabrics**

Mary Lynn Realff, Anneil Basnandan, Lindsay Evens, Elizabeth McCartin, Matthew Realff

Georgia Institute of Technology, Atlanta, Georgia

**11:15 Modeling the Impact Behavior of High-Strength Fabric Structure**

Yiping Duan<sup>1</sup>, Michael Keefe<sup>2</sup>, Travis Bogetti<sup>3</sup>, Bryan Cheesman<sup>3</sup>

<sup>1</sup>Center for Composite Materials, University of Delaware; <sup>2</sup>Department of Mechanical Engineering, University of Delaware; <sup>3</sup>Composite and Lightweight Structures Branch, Army Research Laboratory, Aberdeen Proving Ground, Maryland

**11:45 CLOSING REMARKS**

**12-1:30 LUNCH**

**Thursday Oct 17 Session A (afternoon)**

**Protective Clothing**

Chair: Don Rivin, U.S. Army Soldier Systems Center

- 1:45 Predicting Performance of Protective Clothing Systems**  
*Jim Barry, Roger Hill*  
Creare Incorporated, Hanover, New Hampshire
- 2:15 Improving the Properties of Protective Clothing by Exposing Nanofiber Webs to a One Atmosphere Uniform Glow Discharge Plasma (OAUGDP)**  
*Peter P. Tsai and J. Reece Roth*  
Textiles and Nonwovens Development Center (TANDEC), University of Tennessee
- 2:45 Heat Resistance and Flammability of High Performance Fibers for Protective Clothing (Virgin Fibers and Blends of High Performance and Natural Fibers)**  
*Xavier Flambard, Serge Bourbigot, Manuela Ferreira, Bernard Vermeulen*  
Laboratoire de Génie et Matériaux Textiles (GEMTEX), Ecole Nationale Supérieure des Arts et Industries Textiles (ENSAIT), Roubaix, France
- 3:15 Evolutionary Design of Barriers and Filters Using Genetic Intelligence**  
*E. Unsal<sup>1</sup>, P. Schwartz<sup>1</sup> and G. Dozier<sup>2</sup>*  
<sup>1</sup>Department of Textile Engineering, Auburn University, Alabama  
<sup>2</sup>Department of Computer Science and Engineering, Auburn University, Alabama
- 3:45 BREAK**
- Comfort Factors**  
Chair: Robin Dent  
Albany International Research Company
- 4:00 Experimental Analysis on Thermal Insulation and Thermal Contact Properties of Animal Furs with Biomimetic Objectives**  
*Lubos Hes*  
Technical University of Liberec, Faculty of Textiles, Czech Republic
- 4:30 Comfort, Muscle Tension & UV Protection**  
*Malgorzata Zimniewska, Ryszard Kozlowski, Michal Rawluk*  
The Institute of Natural Fibres, Poznan, Poland
- 5:00 Water Vapor Permeability of Hydrophilic Polyurethane Membrane With Melting Point as Switch Temperature**  
*X. M. Ding<sup>1</sup>, J. L. Hu<sup>1</sup>, C. P. Hu<sup>2</sup>, and X. M. Tao<sup>1</sup>*  
<sup>1</sup>Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong, P. R. China,  
<sup>2</sup>Institute of Material Science and Engineering, East China University of Science and Technology, Shanghai, P. R. China
- 5:30 ADJOURN**
- 6:30 RECEPTION**
- 7-9 PM BANQUET**  
After Dinner Talk on "Future Army Clothing System"  
Caleb Crye, Director, Crye Associates

**Thursday Oct 17 Session B (morning)**

**7:00 REGISTRATION**  
**Pick Up Breakfast**

**Nanofibers and Electrospinning**

**Chair: You-Lo Hsieh, University of California Davis**

**8:00 Functionalized Nanofibers by Electrospinning**

Andreas Greiner

Philipps-Universität Marburg, FB Chemie, Institut für Physikalische Chemie, Kernchemie und Makromolekulare Chemie, Marburg, Germany

**8:30 Numerical Modeling of an Electrostatically Driven Liquid Meniscus in the Cone-jet Mode**

Bakhtier Farouk, Fang Yan, Frank Ko\*

Department of Mechanical Engineering and Mechanics, \* Department of Materials Engineering, Drexel University, Philadelphia, Pennsylvania

**9:00 Electrospun Molecular Sieve and Composite Fibers**

Kenneth J. Balkus, Jr., Sudha Madhugri, John P. Ferraris

University of Texas at Dallas, Department of Chemistry and the UTD NanoTech Institute, Richardson, Texas

**9:30 Electrospinning of Poly(Vinyl Alcohol), Copolymers, and Derivatives**

E.-R. Kenawy,<sup>1</sup> L. Yao,<sup>1</sup> J. Layman,<sup>1</sup> E. Sanders,<sup>1</sup> R. Kloefkorn,<sup>1</sup> G. L. Bowlin,<sup>2</sup> D. G. Simpson<sup>3</sup> and G. E. Wnek<sup>1</sup>

Departments of Chemical Engineering<sup>1</sup>, Biomedical Engineering<sup>2</sup>, and Anatomy<sup>3</sup>, Virginia Commonwealth University, Richmond, Virginia

**10:00 BREAK**

**10:15 Evaluation of Pore Structure Characteristics of Nanofiber Nonwovens**

Akshaya Jena and Krishna Gupta

Porous Materials, Inc., Ithaca, New York

**10:45 Electrospinning of Nylons, Poly(ethylene terephthalate) and Their Blends**

Kevin M. Kit, Sudhakar Jagannathan

Department of Material Science and Engineering, University of Tennessee, Knoxville, Tennessee

**11:15 Carbon Nanotube Based Nanocomposite Fibrils by Electrospinning**

Frank K. Ko, Ashraf Ali, Yury Gogotsi, Guoliang Yang, Christopher Li

Drexel University, Philadelphia, Pennsylvania

**11:45 CLOSING REMARKS**

**12-1:30 LUNCH**

**Thursday Oct 17 Session B (afternoon)**

**Nanofibers and Electrospinning**

**Chair: Julie Chen**

**University of Massachusetts Lowell**

- 1:45 Liquid Interactions in Electrospun Fibrous Membranes - Effects of Electrospinning and Chemical Reactions**  
You-Lo Hsieh  
Fiber and Polymer Science, University of California at Davis, Davis, California
- 2:15 Application of Electrospinning to the Reinforcement and Fabrication of Gossamer Space Structures**  
Kevin White, John Lennhoff, Edward Salley, Karen Jayne  
Physical Sciences Inc., Andover, Massachusetts,
- 2:45 Studies on the Internal Structure of Nanofibers**  
R. Dersch, Taiqi Liu, A. K. Schaper, A. Greiner, J.H. Wendorff  
Department of Chemistry and Material Science Center, Philipps University, Marburg, Germany
- 3:15 Characterization of Conducting Polymer Nanofibers Prepared via Electrospinning**  
N.J. Pinto<sup>1</sup>, Y.X. Zhou<sup>2</sup>, M. Freitag<sup>2</sup>, A.T. Johnson<sup>2</sup> and A.G. MacDiarmid<sup>1</sup>  
<sup>1</sup>Department of Chemistry, University of Pennsylvania, Philadelphia, Pennsylvania  
<sup>2</sup>Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, Pennsylvania
- 3:45 BREAK**
- 4:00 Polycarbonate Fibers by Electrospinning and Ceramic Coating on Nano-Fibers for Photovoltaic Cells**  
Jamila Shawon<sup>1</sup>, Christopher Drew<sup>2</sup>, Changmo Sung<sup>1</sup>  
<sup>1</sup> Department of Chemical Engineering and Center for Advanced Materials, <sup>2</sup> Department of Chemistry and Center for Advanced Materials, University of Massachusetts Lowell
- 4:30 Unique Micro and Nanostructured Morphologies on Electrospun Materials**  
JS Stephens<sup>1</sup>, CL, Casper<sup>1</sup>, JF Rabolt<sup>1</sup>, NG Tassi<sup>2</sup>, DB Chase<sup>2</sup>  
<sup>1</sup>Department of Materials Science and Engineering, Delaware Biotechnology Institute, University of Delaware, Newark, Delaware, <sup>2</sup>Central Research and Development, Dupont, Wilmington, Delaware
- 5:00 Pore Structure and Wetting Properties of Carbon Nanotube Fibers**  
Alexander V. Neimark<sup>1</sup>, Sigrid Ruetch<sup>1</sup>, Konstantin G. Kornev<sup>1</sup>, Peter I. Ravikovitch<sup>1</sup>, Stéphane Badaire<sup>2</sup>, Maryse Maugey<sup>2</sup> and Philippe Poulin<sup>2</sup>  
<sup>1</sup>Center for Modeling and Characterization of Nanoporous Materials TRI/Princeton, Princeton, New Jersey  
<sup>2</sup> Centre de Recherche Paul Pascal/CNRS, Université Bordeaux, France
- 5:30 ADJOURN**
- 6:30 RECEPTION**
- 7-9 PM BANQUET**  
After Dinner Talk on "Future Army Clothing Systems"  
Caleb Crye, Director, Crye Associates

## **FRIDAY Oct 18    Session A**

### **Fiber/Film Composites**

**Chair: Joey Mead**

**University of Massachusetts Lowell**

- 8:00      A Stochastic Simulation of Interfacial Failure in Fiber Reinforced Polymer Composites**  
*Wen Zhong and Ning Pan*  
Division of Textiles and Clothing, Biological & Agricultural Engineering,  
University of California at Davis, Davis, California
- 8:30      Hot Compaction of PET Fibers: Influence of Processing on Crystallinity and Mechanical Properties**  
*P. Rojanapitayakorn, P. T. Mather, R. A. Weiss, A. J. Goldberg†*  
Polymer Science Program and Department of Chemical Engineering, University of Connecticut, Storrs,  
Connecticut, †UCONN Health Center, University of Connecticut, Farmington, Connecticut
- 9:00      Nanoclay Modified Dyeable Polypropylene**  
*Qinguo Fan, Samuel C. Ugbolue, Alton R. Wilson, Yassir S. Dar, Yiqi Yang<sup>1</sup>*  
Department of Textile Sciences, University of Massachusetts Dartmouth, North Dartmouth,  
Massachusetts, <sup>1</sup>Department of Textiles, Clothing & Design and Department of Biological Systems  
Engineering, University of Nebraska-Lincoln, Lincoln, Nebraska
- 9:30      Size Reduction of Clay Particles For Nanocomposite Polypropylene**  
*Gopinath Mani, Qinguo Fan, Samuel C. Ugbolue, Isabelle M. Eiff*  
Department of Textile Sciences, University of Massachusetts Dartmouth, Massachusetts

**10:00      BREAK**

### **Innovative Applications**

**Chair: Tom Godfrey**

**U.S. Army Soldier Systems Center**

- 10:15      Air Particulate Filtration Through Parallel Fiber Alignment**  
*Kyung-Ju Choi*  
AAF International, Louisville, Kentucky
- 10:45      Image Processing Technology in Textile Applications**  
*B.K. Behera*  
Department of Textile Technology, Indian Institute of Technology, New Delhi, India
- 11:15      Innovative Assembly- Future Clothing Fabrication Processes**  
*Steve Szczesuil, Steven Paquette, Brian Corner, Peng Li*  
U.S. Army Soldier Systems Center, Natick, Massachusetts
- 11:45      Melt Blown and Spunbond Thermoplastic Polyurethanes for Elastic Military Protective Chemical Liners and for Other Possible Military Applications**  
*Larry C. Wadsworth<sup>1</sup>, Youn Eung Lee<sup>1</sup>, Heidi L. Schreuder-Gibson<sup>2</sup>, Phillip W. Gibson<sup>2</sup>*  
<sup>1</sup>Textiles and Nonwovens Development Center (TANDEC), University of Tennessee, Knoxville,  
Tennessee; <sup>2</sup>U.S. Army Soldier Biological Chemical Command, Natick, Massachusetts
- 12:15      CLOSING REMARKS**



**FRIDAY Oct 18    Session B**

**Nanofibers and Electrospinning**

**Chair: Steve Warner**

**University of Massachusetts Dartmouth**

- 8:00      Physics of Electrostatic Production of Nanofibers (Electrospinning)**  
*S. V. Fridrikh<sup>a</sup>, J. H. Yu<sup>a</sup>, M. P. Brenner<sup>b</sup>, G. C. Rutledge<sup>a</sup>*  
<sup>a</sup> Department of Chemical Engineering, Massachusetts Institute of Technology,  
Cambridge, Massachusetts,  
<sup>b</sup> Division of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts
- 8:30      Ultrafine Fibers from Electrostatic Solution Spinning**  
*Veli E. Kalayci, Prabir K. Patra, Samuel C. Ugbolue, Yong K. Kim, Steven B. Warner*  
Textile Sciences Department, College of Engineering, University of Massachusetts,  
Dartmouth, Massachusetts
- 9:00      Viscosity Effect on Fiber Morphology in Highly Filled Fibers**  
*Christopher Drew, Jamila Shawon, Xianyan Wang, Lynne Samuelson<sup>o</sup>, Jayant Kumar*  
University of Massachusetts, Lowell, <sup>o</sup> Natick Soldier Center, U.S. Army Soldier, Biological, Chemical  
Command, Natick, Massachusetts
- 9:30      Novel Bonding Process for CBW Protective Electrospun Fabric Laminates**  
*John D. Lennhoff<sup>1</sup>, Poonam Narula<sup>1</sup>, Karen Jayne<sup>1</sup>, Heidi Schreuder-Gibson<sup>2</sup>, Phillip Gibson<sup>2</sup>*  
<sup>1</sup>Physical Sciences Inc., 20 New England Business Center, Andover, Massachusetts,  
<sup>2</sup>U.S. Army Soldier Systems Center, Natick, Massachusetts
- 10:00     BREAK**
- 10:15     Combination of Electrospinning and Electrostatic Layer-by-Layer Self Assembly:  
A New Strategy for Sensor Fabrication**  
*Xianyan Wang, Young-Gi Kim, Christopher Drew, Bon-Cheol Ku, Jayant Kumar, Lynne A. Samuelson\**  
University of Massachusetts Lowell, Lowell, Massachusetts, \*Natick Soldier Center, U.S. Army Soldier  
& Biological Chemical Command, Natick Massachusetts
- 10:45     Quality Control in Manufacturing of Electrospun Nanofiber Composites**  
*Dmitry M. Luzhansky*  
Donaldson Company, Inc., Minneapolis, Minnesota
- 11:15     Control of the Morphology and Orientation of Electrospun Nano-Fibers**  
*Samira Farboodmanesh, Julie Chen, Navin Bunyan, Kari Stevens*  
University of Massachusetts Lowell, Lowell, Massachusetts
- 11:45     Nanofiber Garlands of Polycaprolactone by Electrospinning**  
*D.H. Reneker<sup>1</sup>, W. Kataphinan<sup>1</sup>, A. Theron<sup>2</sup>, E. Zussman<sup>2</sup>, and A.L. Yarin<sup>2</sup>*  
<sup>1</sup>Department of Polymer Science, The University of Akron, Akron, Ohio;  
<sup>2</sup>Department of Mechanical Engineering, The Technion, Haifa, Israel
- 12:15     CLOSING REMARKS**

## Poster Presentations

**6:00-8:00 Wednesday, 16 October**

1. **Woven Fabric Engineering Using Artificial Intelligence**  
*B.K.Behera and S.B.Muttagi*  
Department of Textile Technology, Indian Institute of Technology, New Delhi, India
2. **Effect of Planar Conduction of Moisture on Measured Water Vapour Permeability of Thin Woven Fabrics**  
*Lubos Hes*  
Technical University of Liberec, Faculty of Textiles, Czech Republic
3. **Manipulation of Nylon 6 Crystal Structures with Molecular Nanotubes**  
*Min Wei and Alan E. Tonelli*  
Fiber and Polymer Science Program, North Carolina State University, Raleigh, North Carolina
4. **The Description and Properties of Medical Textiles**  
*Nurhan Onar*  
Pamukkale University, Textile Engineering Department, Camlik Campus, Camlik/Denizli, Turkey
5. **Characterization of Electrospun Fibers of Polyimide/ MMT Nanocomposites**  
*Zhaohui Sun, Darrell H. Reneker*  
Department of Polymer Science, University of Akron, Ohio
6. **Protective Textiles: Permethrin Treated Camouflage Uniforms**  
*Bartley McNally*  
U.S. Army Soldier Systems Center, Natick, Massachusetts
7. **The Role of Baffles in Fiber Dispersion in Mixing Tanks**  
*H. Vahedi Tafreshi and Behnam Pourdeyhimi*  
Nonwovens Cooperative Research Center, North Carolina State University, Raleigh, North Carolina
8. **Physician's Attitudes Toward the Utilization of Smart Fabrics in Cybermedicine**  
*Ella Carter*  
University of North Carolina-Greensboro, Greensboro, North Carolina
9. **Mechanical Properties of Electrostatically Spun, Nonwoven Fiber Membranes**  
*A. Pedicini and R.J. Farris*  
Polymer Science & Engineering, University of Massachusetts, Amherst, Massachusetts
10. **Fatigue Behavior of Nylon Industrial Yarns**  
*Rodney Averett, Mary Lynn Realff and Stephen Michielsen*  
School of Textile & Fiber Engineering, Georgia Institute of Technology, Atlanta, Georgia
11. **Dry-jet Wet Spinning of Fire Safe Polymers Poly(hydroxy amide) and Poly(methoxy amide)**  
*Eui-Sang Yoo, E. Bryan Coughlin and Richard J. Farris*  
Department of Polymer Science and Engineering, University of Massachusetts

12. **Biodegradable/Bioresorbable Scaffolding for the Re-Growth of Bone Tissue Developed from Electrospun Fibers**  
*S. Iadarola\**, *A. Crugnola\*\**, *R. Joshi\*\**, *J. Tessier\*\*\**, *B. Kang\**, *S. Farboodmanesh\*\*\*\**, *C. Sung\**  
\*Department of Chemical and Nuclear Engineering, Center for Advanced Materials, University of Massachusetts Lowell; \*\*Department of Plastics Engineering, University of Massachusetts Lowell; \*\*\*Department of Clinical Science, University of Massachusetts Lowell; \*\*\*\*Department of Mechanical Engineering, University of Massachusetts Lowell; Lowell, MA
13. **Tridimensional Fabrics for Smart Textiles**  
*Miguel, R.A.L.<sup>1</sup>*, *Lucas, J.M.<sup>1</sup>*, *Manich, A.M.<sup>2</sup>*, *Carvalho, J.<sup>1</sup>*  
<sup>1</sup>University of Beira Interior/Textile Department, Covilhã, Portugal; <sup>2</sup> Institute of Chemical and Environmental Research/Ecotechnologies Department, (CSIC), Barcelona, Spain
14. **Molecular Simulation of Polymer Crystallization: Nucleation from Pre-oriented Melt**  
*Min Jae Ko*, *Numan Waheed*, *Marc S. Lavine*, *Gregory C. Rutledge*  
Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts
15. **Crucial parameters for electrospun polymer nanofibers**  
*Zeng Jun*, *Michael Bognitzki*, *Haoqing Hou*, *J. H. Wendorff*, *Andreas Greiner*  
Philipps-Universität Marburg, FB Chemie, Marburg, Germany
16. **Water Vapor Transfer Through Textile Under a Temperature and Humidity Gradient**  
*Nefzi Nada*, *Ben Nasrallah Sassi*  
Ecole Nationale d'Ingénieurs de Monastir, Tunisia
17. **Fabric Softness Classification Using Surface Fiber Profiles: Fuzzy Logic Approach**  
*Eun Ae Kim*, *Dong Ock Kim*, *Shin Jung Yoo* and *Jooyong Kim*  
Dept. of Clothing and Textile, Yonsei University, Seoul, Korea  
\*Dept. of Textile Engineering, Soongsil University, Seoul, Korea
18. **Electrospinning Biocompatible Polymer Nanofibers**  
*Woraphon Kataphinan*<sup>\*1</sup>, *Darrell Reneker*<sup>1</sup>, *Daniel Smith*<sup>2</sup>  
<sup>1</sup>Maurice Morton Institute of Polymer Science, <sup>2</sup> Department of Chemistry, University of Akron, Ohio
19. **Poly(meta-phenylene isophthalamide) Nanofiber Templates for Nanotube Synthesis**  
*Wenxia Liu*, *Edward A. Evans*<sup>+</sup>, *Darrell H. Reneker* and *Brian J. Satola*<sup>+</sup>  
Department of Polymer Science, <sup>+</sup> Department of Chemical Engineering, University of Akron, Ohio
20. **Electrospinning of Molten Polycaprolactone in Air**  
*Ratthapol Rangkupan* and *Darrell H. Reneker*  
Department of Polymer Science, The University of Akron, Akron, Ohio
21. **Prediction of Electrospinning Jet Diameter via Interference Colors**  
*Han Xu*, *Daniel Galehouse*, *Darrell Reneker*  
Maurice Morton Institute of Polymer Science, University of Akron, Akron, Ohio
22. **Surface Modification of Natural Fibres by Using b-Cyclodextrin Derivative**  
*Bojana Voncina*, *Nataša Majcen*, *Alenka Majcen le Marechal*  
University of Maribor, Faculty of Mechanical Engineering, Textile Department, Maribor, Slovenia
23. **Use of Electrospun Nanofibers for Aerosol Filtration In Textile Structures**  
*Heidi Schreuder-Gibson* and *Phil Gibson*  
U.S. Army Soldier Systems Center, Natick, Massachusetts

- 24. Temperature-Dependent Water Vapor Diffusion Through Shape-Memory Polymer Laminates: Comparison with Other Waterproof-Breathable Laminates**  
*Phil Gibson*  
U.S. Army Soldier Systems Center, Natick, Massachusetts
- 25. Comfort Properties of Textiles as a Function of Treatment**  
*Majda Sfiligoj Smole, Bojana Voncina, Kristina Stakne, Karin Stana Kleinschek, Jelka Geršak*  
University of Maribor, Textile Department, Maribor, Slovenia
- 26. Making Matrix-Free Spectra Fiber Reinforced Composites**  
*Tao Xu*  
Polymer Science and Engineering Department, Silvio O. Conte National Center for Polymer Research, University of Massachusetts Amherst, Amherst, Massachusetts
- 27. Effect of Fabric Construction on Mechanical Behavior of Fabric Reinforced Rubber**  
*Samira Farboodmanesh\*, Julie Chen\*, Kari Stevens\*, and Joey Mead\**  
\*Advanced Composite Materials and Textile Research Lab, Department of Mechanical Engineering;  
\*Department of Plastics Engineering; University of Massachusetts Lowell, Lowell, Massachusetts
- 28. Treatment of Cotton Fibers with Purified Cellulases**  
*Anand P. Kanchagar and J. Nolan Etters*  
University of Georgia, Athens GA
- 29. Preparations of the Nanostructured TiO<sub>2</sub>/Ethylene Glycol (EG) Colloid Solutions as a Precursor for the In Situ Polymerization of PET**  
*I-Shou Tsai<sup>1</sup>, Pen-Yi Liao<sup>2</sup>, Yi-Chun Yeh<sup>1</sup>, Rong -Fuh Louh<sup>2</sup>, Jeng-Yue Wu<sup>3</sup>, Tung-Ying Kuo<sup>4</sup>*  
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<sup>3</sup> Graduate Institute of Materials Science, National Chung Hsing University, Taichung, Taiwan.  
<sup>4</sup> Materials Research Laboratories of Industrial Technology Research Institute, Hsinchu, Taiwan.
- 30. Structure and Transport Properties in Electrospun Butyl Rubber Membranes**  
*Nantiya Viriyabanthorn, Jamila Shawon, Joey L. Mead, and Ross G. Stacer*  
Department of Plastics Engineering, University of Massachusetts Lowell, Lowell, Massachusetts
- 31. Characterization of Beaded PU Nanofibers Deposited on Electrospun PET Nonwovens**  
*Hak Yong Kim, Myung Seob Khil<sup>+</sup>, Min Sub Kim<sup>+</sup>, Dong Il C Cha and Kwan Woo Kim*  
Department of Textile Engineering, Chonbuk National University, Chonju, Korea  
<sup>+</sup> R&D Division, Raisio Chemicals Korea Inc., Chonan, Korea
- 32. A Study on Electrospun Poly(vinyl acetate) Nonwovens**  
*Hak Yong Kim<sup>1</sup>, Keun Hyung Lee<sup>2</sup>, Kyung Ju Choi<sup>3</sup>, Bong Souk Lee<sup>2</sup>, Douk Rae Lee<sup>1</sup>*  
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<sup>2</sup>Dept. of Advanced Organic Materials Engineering, Chonbuk National University, Republic of Korea  
<sup>3</sup>AAF International, Louisville, Kentucky
- 33. Electrospun Hybrid Nanofibers of Alumina-Boria-Silica**  
*Hak Yong Kim<sup>1</sup>, Hongqin Dai<sup>2</sup>, Jian Gong<sup>3</sup>, Douk Rae Lee<sup>1</sup>*  
<sup>1</sup> Dept. of Textile Engineering., Chonbuk National University., Chonju, South Korea  
<sup>2</sup> Material Engineering Institute, Soochow University, Suzhou, China  
<sup>3</sup> Department of Chemistry, Northeast Normal University, Changchun, China

- 34. Carbon Nanofibers Hybridized with Palladium Nanoparticles Produced by Electrospinning**  
*Haoqing Hou and Darrell H. Reneker, Andreas Greiner\* and Joachim H. Wendorff\**  
Department of Polymer Science, The University of Akron, Akron, Ohio;  
\*Philipps-University Marburg, Department of Chemistry, Institute of Physical Chemistry, Nuclear Chemistry, and Macromolecular Chemistry and Scientific Center for Materials Science, Marburg, Germany
- 35. Melt Electrospinning of Thermoplastic Polymers**  
*Jason Lyons, Frank Ko, Amotz Geshury*  
Fibrous Materials Research Lab, Drexel University, Philadelphia, Pennsylvania
- 36. Hand Value by Wet Cleaning of Wool Fabric**  
*Yoshihiro Yamashita, Hiroshi Okaji and Akira Tanaka*  
The University of Shiga Prefecture, Hikone, Japan
- 37. Absorption of Fluids by Fibrous Substrates and Nanofiber Webs**  
*Konstantin G. Kornev<sup>1</sup>, Alexander V. Bazilevsky<sup>2</sup>, Aleksey N. Rozhkov<sup>2</sup>, and Alexander V. Neimark<sup>1</sup>*  
<sup>1</sup>Center for Modeling and Characterization of Nanoporous Materials TRI/Princeton, Princeton, New Jersey; <sup>2</sup>Institute for Problems in Mechanics, Russian Academy of Sciences, Moscow, Russia.
- 38. Numerical Calculation of High Speed Traversing Motion in Weaving and Winding**  
*Manuel Spoerri*  
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Federal Institute of Technology, Zurich, Switzerland
- 39. Electrospinning of Biopolymers**  
*Chen-Ming Hsu, Jing Tao and Satya Shivkumari*  
Department of Mechanical Engineering, Worcester Polytechnic Institute, Worcester, Massachusetts
- 40. Structural and Conformational Characterization of Poly(ethylene 2,6 naphthalate) by Infrared Spectroscopy**  
*Nad Vasanthan*  
TRI/Princeton, Princeton, New Jersey
- 41. Elastomeric Selectively Permeable Membranes for Chemical and Biological Protective Clothing**  
*Quoc Truong<sup>1</sup>, Shantha Sarangapani<sup>2</sup>*  
<sup>1</sup>Natick Soldier Center, Natick, Massachusetts,  
<sup>2</sup>Innovative Chemical and Environmental Technologies, Inc., Norwood, Massachusetts
- 42. Development of Amphibious Operations Suits**  
*Quoc Truong*  
Natick Soldier Center, Natick, Massachusetts
- 43. Electrospun Polymer and Polymer/Clay Carbon Nanotube Composite Fibers**  
*Kenneth J. Balkus, Jr., Sudha Madhugri, Raluca Matea, John P. Ferraris, Alan Dalton, Arnvar Zhakidov*  
University of Texas at Dallas, Department of Chemistry and the UTD NanoTech Institute, Richardson, Texas
- 44. Continuous Processing and Yarn Properties of Electro-Spun Polyacrylonitrile Solution**  
*Ashraf A. Ali, Amotz J. Geshury and Frank K. Ko*  
Fibrous Materials Research Center, Drexel University, Philadelphia, Pennsylvania

- 45. Investigation of Structure-Property Relationship in In-Situ Composite Fibers Based on a Thermotropic Liquid Crystalline Polymer**  
*Xiaojun He, Michael S. Ellison and Rajesh P. Paradkar*  
School of Materials Science & Engineering and Center for Advanced Engineering Fibers and Films, Clemson University, Clemson, South Carolina
- 46. Process Oriented Analysis**  
*Andrea Weber Marin, Simone Creux*  
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- 47. New Method of CW Protective Composite Development: An Exploratory Study**  
*S. S. Ramkumar\**, *Heidi Schreuder-Gibson+* and *D. H. Reneker\*\**  
\*Nonwovens Laboratory, The Institute of Environmental and Human Health, Texas Tech University, Lubbock, Texas; + US Army Soldier Systems Center, Natick, Massachusetts; \*\*Institute of Polymer Science, The University of Akron, Ohio
- 48. Fibers and Films of Polyacrylonitrile Acrylic Acid Copolymers**  
*M.M. Demir<sup>a</sup>, A. V. Mironov<sup>b</sup>, A. R. Khokhlov<sup>b</sup>, and B. Erman<sup>a</sup>*  
<sup>a</sup>Faculty of Engineering and Natural Sciences, Sabanci University, Istanbul, Turkey  
<sup>b</sup>Physics Department, Moscow State University, Moscow, Russia
- 49. Fundamental Investigations on the Electrospinning Process to Make Polymeric Nanofibers**  
*Pankaj Gupta, G.L. Wilkes*  
Virginia Polytechnic Institute and State University, Blacksburg, Virginia
- 50. Contribution to the Understanding of Tribological Mechanisms During an Abrasive or Chemical Wear of Fibrous Structures: Industrial Application to Polyester Wool Fabrics**  
*Stephane Fontaine*  
Ecole Nationale Supérieure des Industries Textiles de Mulhouse, Mulhouse, France

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**Spring 2003 Technical Meeting**  
**June 30 - July 2, in Loughborough, UK**

The 2003 Spring Technical meeting on "Advanced Flexible Materials and Structures: Engineering with Fibers," will be held at the University of Loughborough, Loughborough, UK, the week of June 30, 2003. A call for papers is being prepared and will be distributed in due course.

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